

CLAIMS

1. An image processing apparatus comprising:

image inputting means;

color analyzing means for analyzing a color used within an input image;

mixing-ratio calculating means for calculating a mixing-ratio of color components based on an analyzed color; and

converting means for converting the input image to a monochromatic image by mixing color components according to a calculated mixing-ratio.

2. The image processing apparatus of claim 1, wherein the image inputting means is capable of inputting a plurality of images;

the color analyzing means analyzes colors used within the plurality of input images;

the mixing-ratio calculating means calculates mixing-ratios of color components which are common to the plurality of images, based on analyzed colors; and

the converting means converts the plurality of input images to monochromatic images by mixing color components according to calculated mixing-ratios.

3. An image processing apparatus comprising:

image inputting means;

color specifying means for externally specifying a color used within an input image;

mixing-ratio calculating means for calculating a mixing-ratio of color components based on a specified color; and

converting means for converting the input image to a monochromatic image by mixing color components according to a calculated mixing-ratio.

4. An image processing apparatus comprising:

image inputting means;

mixing-ratio specifying means for externally specifying a mixing-ratio of color components; and

converting means for converting an input image to a monochromatic image by mixing color components according to a specified mixing-ratio.

5. An image processing method comprising:

a color analyzing step of analyzing a color used within an input image;

a mixing-ratio calculating step of calculating a mixing-ratio of color components based on an analyzed color; and

a converting step of converting the input image to a

monochromatic image by mixing color components according to a calculated mixing-ratio.

6. The image processing method of claim 5, wherein in the color analyzing step color analysis is carried out based on distribution of hue, saturation and lightness of the input image.

7. An image processing method comprising:
a color analyzing step of analyzing colors used within a plurality of input images;

a mixing-ratio calculating step of calculating mixing-ratios of color components which are common to the plurality of input images, based on analyzed colors; and

a converting step of converting the plurality of input images to monochromatic images by mixing color components according to calculated mixing-ratios.

8. An image processing method comprising:
a color specifying step of externally specifying a color used within an input image;

a mixing-ratio calculating step of calculating a mixing-ratio of color components based on a specified color; and

a converting step of converting the input image to a

monochromatic image by mixing color components according to a calculated mixing-ratio.

9. The image processing method of any one of claims 5, 6 and 8, wherein in the mixing-ratio calculating step a mixing-ratio is calculated based on a mixing-ratio table in which a mixing-ratio of color components corresponding to the color used within the input image is previously stored.

10. The image processing method of any one of claims 5, 6 and 8, wherein in the mixing-ratio calculating step the mixing-ratio is calculated based on a ratio of color components of a complimentary color of the color used within the input image.

11. The image processing method of any one of claims 5, 6 and 8, wherein in the mixing-ratio calculating step the mixing-ratio is calculated based on a color component ratio of a complimentary color of the color used within the input image and the color component ratio of the colors used within the input image.

12. An image processing method comprising:

a mixing-ratio specifying step of externally specifying a mixing-ratio of color components of an input image; and

a converting step of converting the input image to a

monochromatic image by mixing color components according to a specified mixing-ratio.

13. An medium on which an image processing program is recorded, the image processing program being for causing a computer to execute a color analyzing step of analyzing a color used within an input image; a mixing-ratio calculating step of calculating a mixing-ratio of color components based on a analyzed color; and a converting step of converting the input image to a monochromatic image by mixing color components according to a calculated mixing-ratio.

14. An medium on which an image processing program is recorded, the image processing program being for causing a computer to execute a color analyzing step of analyzing colors used within a plurality of input images; a mixing-ratio calculating step of calculating mixing-ratios of color components which are common to the plurality of input images, based on analyzed colors; and a converting step of converting the plurality of input images to monochromatic images by mixing color components according to calculated mixing-ratios.

15. An medium on which an image processing program is recorded, the image processing program being for causing a computer to execute a color specifying step of externally specifying a color

used within an input image; a mixing-ratio calculating step of calculating a mixing-ratio of color components based on a specified color; and a converting step of converting the input image to a monochromatic image by mixing color components according to a calculated mixing-ratio.

16. An medium on which an image processing program is recorded, the image processing program being for causing a computer to execute a mixing-ratio specifying step of externally specifying a mixing-ratio of color components of an input image; and a converting step of converting the input image to a monochromatic image by mixing color components according to a specified mixing-ratio.

17. An image processing apparatus comprising:

image inputting means for inputting an image;

character/line drawing region extracting means for extracting a character/line drawing region from the input image;

pseudo-density region extracting means for extracting a pseudo-density region from the input image;

image contracting means for contracting images in an extracted pseudo-density region, an extracted character/line drawing region, and a region other than the pseudo-density region and the character/line drawing region, by mutually

different methods; and

image outputting means for outputting the contracted image.

18. The image processing apparatus of claim 17, wherein the image contracting means performs a smoothing process in the pseudo-density region, performs an averaging process and a subsequent edge enhancing process in the character/line drawing region, and performs an averaging process in a region other than the pseudo-density region and the character/line drawing region.

19. The image processing apparatus of claim 17, wherein the character/line drawing region extracting means extracts a character/line drawing region from the input image before the extraction of a pseudo-density region.

20. The image processing apparatus of claim 19, wherein the character/line drawing region extracting means extracts a character/line drawing region by performing an edge extraction of the input image after performing a smoothing process thereof.

21. The image processing apparatus of any one of claims 17, 19 and 20, wherein the pseudo-density region extracting means calculates a dispersion of peripheral pixels around each pixel

of the input image and extracts, as a pseudo-density region, the pixel which is one of pixels having a large dispersion and exists in a region which is not extracted as a character/line drawing region by the character/line drawing region extracting means.

22. The image processing apparatus of any one of claims 17, 19 and 20, wherein the pseudo-density region extracting means calculates a correlation of peripheral pixels around each pixel of the input image and extracts, as a pseudo-density region, a pixel which is one of pixels having a low correlation and exists in the region which is not extracted as a character/line drawing region by the character/line drawing region extracting means.

23. The image processing apparatus of any one of claims 17, 19 and 20, wherein the pseudo-density region extracting means detects an edge region of the input image and extracts, as a pseudo-density region, a region which is one of the extracted edge regions and is not extracted as a character/line drawing region by the character/line drawing region extracting means.

24. The image processing apparatus of claim 18, wherein the contracting means performs edge detection of an extracted pseudo-density region and repeats the smoothing process for a region having a density greater than or equal to a predetermined

value.

25. The image processing apparatus of claim 17, wherein the image contracting means performs edge detection of the extracted pseudo-density region and interrupts a contracting process for a region having a density greater than or equal to a predetermined value.

26. An image processing method comprising:
an image inputting step;
a character/line drawing region extracting step of extracting a character/line drawing region from an input image;
a pseudo-density region extracting step of extracting a pseudo-density region from the input image;
a image contracting step of contracting the image using mutually different methods respectively in the extracted pseudo-density region, the extracted character/line drawing region and the region other than the pseudo-density region and the character/line drawing region; and
an image outputting step of outputting an contracted image.

27. An medium recording an image processing program for causing a computer to execute an image inputting step; a character/line drawing region extracting step of extracting a

character/line drawing region from an input image; a pseudo-density region extracting step of extracting a pseudo-density region from the input image; an image contracting step of contracting the image using mutually different methods respectively in the extracted pseudo-density region, the extracted character/line drawing region and the region other than the pseudo-density region and the character/line drawing region; and an image outputting step of outputting a contracted image.

28. An image processing apparatus comprising:

image inputting means for inputting front and back images of an original;

image reversing means for reversing one of the front and back images;

positional relationship detecting means for detecting the positional relationship between the front image reversed by the image reversing means and the back image from the image inputting means or the positional relationship between the back image reversed by the image reversing means and the front image from the image inputting means;

image correcting means for correcting the image to eliminate a ghost image of the image using the positional relationship between the front and back images obtained from the positional relationship detecting means; and

image outputting means for outputting the image.

29. The image processing apparatus of claim 28, wherein the positional relationship detecting means detects the positional relationship between the front and back images by extracting the high brightness component alone of the front and back images and by performing the block matching of the high brightness component.

30. An image processing apparatus comprising:

image inputting means;

edge detecting means for detecting an edge of the image
form the image inputting means;

image correcting means for correcting the image to
eliminate a ghost image of the image by raising the brightness
of high brightness pixels other than the edge of the image
outputted from the edge detecting means; and

image outputting means for outputting the image.

31. An image processing apparatus comprising:

image inputting means;

edge detecting means for detecting an edge of the image
form the image inputting means;

image dividing means for dividing the image depending on
the edge and low brightness pixels of the image outputted from

the edge detecting means;

image correcting means for correcting the image to eliminate a ghost image of the image by calculating the average brightness within a region divided by the image dividing means and by raising the brightness of the high brightness region alone; and

image outputting means for outputting the image.

32. The image processing apparatus of claim 31, wherein the image correcting means acquires an representative brightness from the pixels having a brightness within a predetermined range, thereby raising the brightness of the region with referencing to the representative brightness.

33. An image processing method comprising:

an image reversing step of reversing one of front and back images of an original;

a positional relationship detecting step of detecting a positional relationship between the reversed one and the other of the front and back images; and

an image correcting step of correcting the other one to eliminate a ghost image of the reversed one using a result of the positional relationship detection.

34. An image processing method comprising:

an image-edge detecting step of detecting an edge of an image; and

an image correcting step of correcting the image to eliminate a ghost image from the image by raising the brightness of high brightness pixels other than a detected edge.

35. An image processing method comprising:

an image-edge detecting step of detecting an edge of an image;

an image dividing step of dividing the image based on a detected edge and low brightness pixels; and

an image correcting step of correcting the image to eliminate a ghost image from the image by calculating an average brightness within a divided region and by raising a brightness of the high brightness region alone.

36. A medium on which an image processing program is recorded, the image processing program being for causing a computer to execute an image reversing step of reversing one of front and back images; a positional relationship detecting step of detecting a positional relationship between the reversed one and the other of the front and back images; and an image correcting step of correcting the image to eliminate a ghost image from the other using a result of the positional relationship detection.

37. An medium on which an image processing program is recorded, the image processing program being for causing a computer to execute an image-edge detecting step of detecting an edge of an image; and an image correcting step of correcting the image to eliminate a ghost image of the image by raising a brightness of a high brightness pixel other than the detected edge.

38. An medium on which an image processing program is recorded, the image processing program being for causing a computer to execute an image-edge detecting step of detecting an edge of an image; an image dividing step of dividing the image based on a detected edge and low brightness pixels; and an image correcting step of correcting the image to eliminate a ghost image from the image by calculating an average brightness within a divided region and by raising a brightness of a high brightness region alone.

39. An image processing apparatus comprising:

image inputting means for inputting an image page by page;

image determining means for determining a predetermined image from among inputted images;

template acquiring means for acquiring a template used as an alignment reference from an image which is determined as the predetermined image; and

image correcting means for correcting a position between the images based on the template, thereby aligning images of consecutive pages.

40. An image processing apparatus comprising:

image inputting means for inputting an image page by page of a book;

image determining means for determining a predetermined main-text image from among inputted images;

template acquiring means for acquiring a template used as an alignment reference from an image which is determined as the predetermined main-text image; and

image correcting means for correcting a position between the main-text images based on the template, thereby aligning the main-text images of consecutive pages.

41. An image processing method comprising:

an image determining step of determining a predetermined image from among images inputted page by page;

a template acquiring step of acquiring a template used as an alignment reference from an image which is determined as the predetermined image; and

an image correcting means for correcting a position between the images based on the template, thereby aligning images of consecutive pages.

42. The image processing method of claim 41, wherein the template acquiring step is a step of acquiring, as a template, positional information of a rectangle defined by circumscribing lines obtained from an ensemble of edge points acquired by scanning the input image.

43. The image processing method of claim 42, wherein the image processing method further comprises a step of generating warning data in the case where the predetermined image is determined from among input images during the image determining step and that positional information of the input image and positional information of the template are out of a predetermined range.

44. An image processing method comprising:

an image determining step of determining a predetermined main-text image from among images inputted page by page of a book;

a template acquiring step of acquiring a template used as an alignment reference from an image which is determined as the predetermined main-text image; and

an image correcting step of correcting a position between the main-text images based on the template, thereby aligning main-text images of consecutive pages.

45. An medium on which an image processing program is recorded, the image processing program being for causing a computer to execute an image determining step of determining a predetermined image from among images inputted page by page; a template acquiring step of acquiring a template used as an alignment reference from an image which is determined as the predetermined image; and image correcting means for correcting a position between images based on the template, thereby aligning images of consecutive pages.

46. An medium on which an image processing program is recorded, the image processing program being for causing a computer to execute an image determining step of determining a predetermined main-text image from among images inputted page by page of a book; template acquiring step of acquiring a template used as an alignment reference from an image which is determined as the predetermined main-text image; and image correcting step of correcting a position between the main-text images based on the template, thereby aligning main-text images of consecutive pages.